# Materials Sciences Division Safety Committee Meeting

The Chemla Room (67-3111)

The Molecular Foundry

Lawrence Berkeley National Laboratory

May 4, 2007



# **Opening Remarks**



 Mark Alper, Deputy Division Director, Materials Sciences Division



# Agenda



- MSD Safety Committee
  - Membership
    - Introduction of new personnel
    - Review of research group membership
  - Review: Function of the MSD Safety Committee
    - Roles: Proposed changes
    - Policies
- Review recent editions of Materials
   Safety
  - Broken Toes/Near Miss/\$1000 reward
  - Chemical Incident/New Student
  - Draft: Vendor Electrical Safety

- Retrospective Look
  - Review of accidents, injuries
  - Hazardous waste NOVs and NCAR
  - Inspection and assessment findings
    - Internal (Rick Kelly/Paul Johnson)
    - Biomedical Waste (Foundry)
    - Fire Protection (Foundry)
- Looking Forward
  - MSD Initiatives for 2007
  - Summary of requested actions
  - Discussion, comment



### **Administrative Issues**

**MSD Safety Committee** 

Membership Roles

# **MSD Safety Committee**

### Membership and Liaisons



Chair and Deputy Chair:

Rick Kelly, Joel Ager

**Building Managers:** 

Gilbert Torres (62, 66, 67), John Turner (72),

**TBD** (2)

MSD EHS Administrative Support:

Lee An Soh

**Electrical Safety Expert:** 

Jim Severns (MSD)

MSD FH&S Technician:

Paul Johnson

Liaisons:

EH&S Liaison to MSD:

John Seabury (EHS)

Waste Generator Assistant Liaison:

Howard Hansen (EHS)

Representative Group

Joel Ager Ager

Edith Bourret-Courchesne Bourret-Courchesne

Ron Tackaberry CXRO

Marca Doeff DeJonghe/Visco

Oscar Dubon
Steve Wu
Norman Mannella
Dubon
Dynes
Fadley

Jeff Beeman Haller/EMAT

Peggy Hou Hou
Zach Jacobson Javey
Ingrid Cotoros Kaindl
Daniel Garcia Lanzara

Z. Liliental-Weber Liliental-Weber

Michael Connolly Molecular Foundry/Bertozzi
Elena Shevchenko Molecular Foundry/Alivisatos
Bruce Harteneck Molecular Foundry/Bokor

Yi Liu Molecular Foundry/Fretchet/Svec

Jeff Neaton Molecular Foundry/Louie

James Bustillo Molecular Foundry User Program

Doreen Ah Tye
Matthew Langner
Joseph Lemberg
NCEM
Orenstein
Ritchie

Virginia Altoe Salmeron/Molecular Foundry

Robert Schoenlein Schoenlein Roger York Somorjai Edurado Saiz Tomsia

Each LBNL-based research group in MSD, including each program in the Molecular Foundry, will designate a primary and backup representative to serve on the Safety Committee

#### Functions and Key Activities of the MSD Safety Committee



#### Functions of safety committee and representatives

- Represent all research groups within MSD
- Stimulate leadership and staff participation in safety program
- Advise Division management and EH&S on safety and health matters
- Perform essential monitoring, educational, investigative and evaluative tasks
- Serve as contact point for EH&S matters in each research group
- Serve as conduit for bringing EH&S information back to research groups

#### Key Activities

- Recommend changes to existing safety rules or the development of new rules
- Recommend improvements in hazard identification and control measures
- Report and discuss unsafe conditions
- Review accidents, incidents and close calls in MSD and generate "Lessons Learned" for use in the Division
- Disseminate EH&S information at group or lab meetings
- Document inspections, investigations, meetings and other EH&S actions at the group level



# A Retrospective Look at EH&S Issues Over the Prior Three Months

### Materials Safety and LBNL Lessons Learned



MATERIALS SCIENCES DIVISION SAFETY UPDATE

APRIL 2007

### \$1000 Reward for Best Reports of Near Misses (April 2007)

# Materials Safety

#### \$1000 Reward Offered for Best Reports of "Near Misses"\*

A Message from Rick Kelly



"Near misses" are a great learning tool—they should be discussed, and action should be taken to avoid a repetition that actually causes an injury.

-Paul Alivisatos, Division Director

#### Incident:

Recently, an MSD employee working on the UC Berkeley campus was injured when a gas cylinder fell on his foot, breaking two toes. The injury occurred during the transportation of gas cylinders using a two-cylinder cart that lacked essential safety features, including the ability to secure each cylinder individually. This cart was used routinely by several hundred people in the chemistry complex.

#### Review:

On several occasions in the past, the injured employee had barely escaped injury when a cylinder fell from this poorly designed cart. He did not, however, report the incidents, or let others in the lab know about the hazard. Had this been done, the cart would have been repaired or removed from service and the injury would not have occurred.

NOTE: Near misses are not counted as accidents and those who report them are praised, not criticized.



Please report all LBNL or campus near misses to Rick Kelly (rjkelly@lbl.gov, 486-4088). For incidents on campus, please concurrently notify the Campus EH&S Office (642-3073).





<sup>\*</sup>A significant reported "near miss" will be selected for reward approximately once each semester.

<sup>\*\*</sup> UCB Lessons Learned report: http://ehs.berkeley.edu/lessonslearned/labslessons7.html

### Materials Safety and LBNL Lessons Learned



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MATERIALS SCIENCES DIVISION SAFETY UPDATE

FEBRUARY 2007

#### Potential Nitric/Hydrofluoric Acid Exposure (February 2007)

# **Materials Safety**

#### Nitric Acid/Hydrofluoric Acid Exposure

A Message from Rick Kelly



New group members may have had some ESH training in earlier positions. That training may not, however, be adequate. Take the time to get thoroughly trained for instruments and procedures you are about to use. In particular, be sure you know what to do if something goes wrong.

-Paul Alivisatos

#### Incident

A student working in a MSD lab experienced a minor exposure to vapor from a nitric acid/hydrofluoric acid etching operation.

The student was attempting to etch a germanium wafer in a mixture of nitric and hydrofluoric acids in a fume hood. He had not performed this particular operation previously but had received verbal instructions from another member of the group. The reaction was more aggressive than expected so he closed the hood and waited until the reaction slowed before attempting to recover his sample.

When he opened the sash he smelled a stinging odor and felt something "warm" on his cheek. Aware of the unique toxicity of hydrofluoric acid as a result of his training, he sought the help of another student in the group, applied calcium gluconate as a first aid measure and dialed 7911 to summon the Fire Department paramedics.

As a precautionary measure, the Fire Department transported the student to the hospital for further evaluation. The hospital determined that he suffered no injury and released him without treatment.

#### Evaluation

This student was previously part of a different research group and had recently joined the group where this incident occurred. Staff in this lab believed his training to perform acid etching was more advanced than it actually was. The guidance provided was general rather than specific and not adequate under the circumstances. He used too little acid at a stronger concentration than appropriate and was working after business hours when few people were around to provide help. Fortunately, his response after the exposure was exactly correct and he was not injured.



### Materials Safety and LBNL Lessons Learned



MATERIALS SCIENCES DIVISION SAFETY UPDATE

APRIL 2007

#### DRAFT: Electrical near miss



Vendors provide a critical service in support of the Labs scientific mission, please work closely with them to ensure that their work is performed safely and in accordance with LBNL requirements.

> -Paul Alivisatos, Division Director

Many scientific devices are maintained or repaired by vendors under a maintenance contract or warranty. An electrical incident in building 2 revealed that a vendor was working on an electrically energized device without following appropriate safety procedures. Similar incidents occurred during the installation of equipment in the new Molecular Foundry.

Measures are being implemented at the institutional and Division levels to ensure safe work on energized equipment by vendors.

1) New and existing service contracts will be screened by the EH&S Division to verify that the vendor's electrical safety procedures are appropriate.

#### Electrical Incident Highlights Vendor Safety

Materials Safety

A Message from Rick Kelly

2) Within the Division, each person responsible for electrical equipment maintained by a vendor must provide the vendor maintenance technician with a copy of

the LBNL policy on lock out/tag out of electrical equipment and work on energized equipment. Do this by asking the technician to read and sign a copy of the attached electrical safety policy summary. If the technician indicates that s/he will need to perform work on the equipment while ener-

gized (other than verifying lock out), contact Rick Kelly who will review the planned work to ensure that it is performed safely.

large scientific equipment as show in Figure 1, reinforcing the requirements for working safely on electrical equipment.

3) The Division will be labeling

#### **ADANGER**

- · Equipment must be de-energized prior to servicing internal components
- Unplug or lock/tag out power
- Verify that equipment is de-energized All work on energized equipment >50
- volts, including testing, MUST be approved by the MSD EH&S Manager

Requirement applies to all service personnel!

Figure 1: Label to be applied to large scientific equipment in

To view official policy, see attached file, or go to:: http://www.lbl.gov/msd/msd\_safety/ MF\_scientific\_equipment\_vendor.p



# MSD Injuries and Incidents



### First Aid Injuries

- Employee tripped over electric heater power cord when hurrying
  - Too much storage under desk
  - No need to be hurrying
  - Problems with temperature control in area to be addressed
- Employee slipped and fell in building 2 hallway, injuring knee (matrixed to MSD from CFO)

# MSD Injuries and Incidents



# Restricted Workday Injury

See discussion of "Near Miss Reward" Materials
 Safety for details of this accident

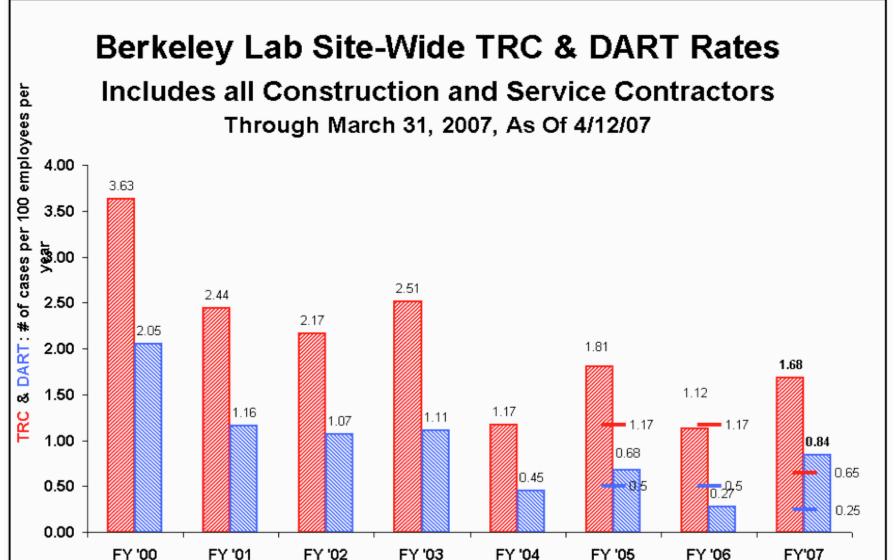
# Other Reported Near Misses



- Container Burst: Hydrogen Peroxide/Ammonium hydroxide waste container burst due to pressure buildup and failure of pressure relieving cap, post doc protected by fume hood sash
  - New procedure controls out gassing
- Tubing Burst: Tubing in HPLC burst before instrument reached automatic shutdown pressure, spraying acetonitrile, employee protected by lab coat and safety glasses
  - Equipment retrofitted and shutdown point lowered
- Wiring Problem: Improper electrical wiring in B72 could have caused shock, prevented by good lock out compliance

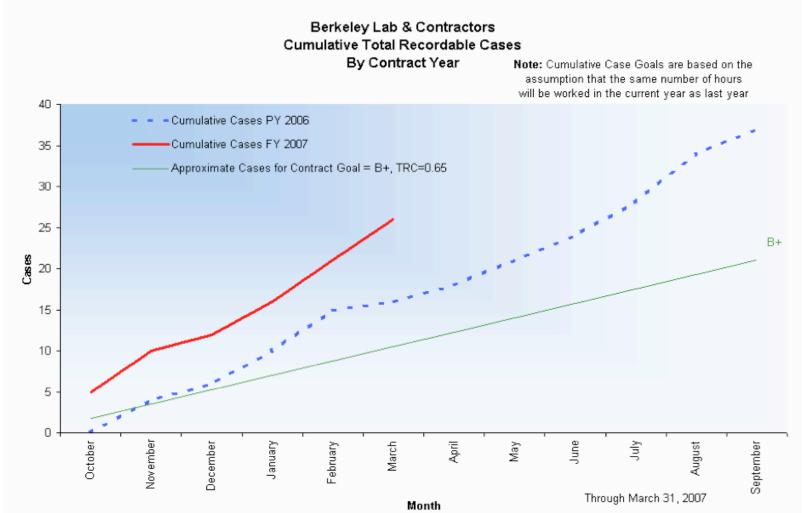
### **Total Recordable Case Rate and Days Away, Restricted or Transferred Rate**





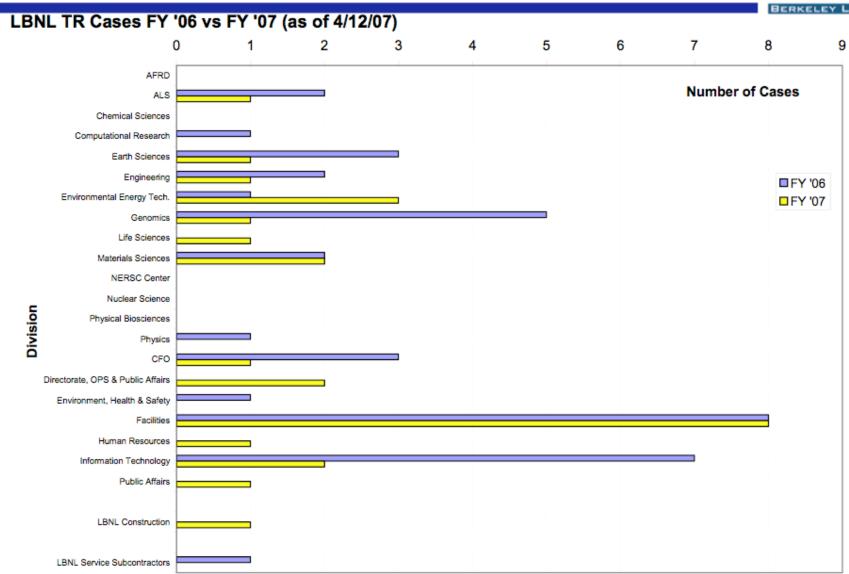
### **Performance vs Contract Goals - TRC**





### LBNL Injury Cases By Division FY'06 vs '07





### Waste QA Deficiencies



None

# Inspection Issues February-April



- EH&S/DOE SAA inspections
- Annual self assessment inspections
- Medical Waste Inspection
- OSHA Audit Verification Inspection

# SAA Inspections & Management



- In the March EH&S/DOE inspection, several SAAs were not following required practices:
  - 62-108 (Lillental-Weber): Labeling error
  - 62-155 (DeJonghe): Labeling error
  - 66-331 (Svec/Meagley): Improper packaging
  - 66-426 (Somorjai): Flammable in glass container >1 liter
  - 67-5201, 5219 (Zuckerman): Labeling errors
  - 67-6201 (Svec): Waste stored more than 9 months

# SAA Inspections & Management



#### Requirements for running an SAA:

- Label each container
- Completely fill out each label
- Date each label
- Place and update the SAA sign as needed
- Store only waste in the SAA
- Use secondary containment
- Dispose of containers that have been in use for 6 months or more
- Segregate solvents, halogenated solvents, acids, bases and other incompatible materials
- Assign an SAA manager and backup manager
- Replace departed SAA managers
- No use of glass bottles > 1 quart for flammables

# Other Inspections



- State Medical Waste Inspection: No problems
- DOE OSHA Finding Closure Inspection: No Problems



# Looking Forward at the EH&S Program in MSD

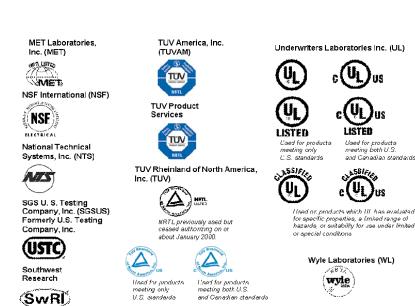
### LBNL Initiatives for 2007



- New electrical equipment should be certified by a Nationally Recognized Testing Lab (NRTL)
- Existing equipment will eventually be inspected by the Engineering Division
- Pending implementation of the institutional program, MSD will hold all purchases > \$5K until Rick Kelly reviews PO

#### Appendix R. NATIONALLY RECOGNIZED TESTING LABORATORIES (NRTLs)

See www.osha.gov/dts/otpca/nrtl/ for the most current list. Applied Research FM Global Technologies LLC (FM) Communication Certification Laboratories Inc (ARL) Also known as FM Approvals and Laboratory, Inc. (CCL) formerly Factory Mutual Research Canadian Standards Curtis-Straus LLC (CSL) Association (CSA) Intertek Testing Services NA, Inc. CURTIS (ITSNA) Formerly ETL Testing STRAUS NRTL/C Electrical Reliability Services, Inc. (ERS). Also known as eti Conformity Services and formerly Electro-Test, Inc. (ETI)) Used for products Used for products 11.S. etandarde and Canadian standards Entela, Inc. (ENT) Used for products Used for products meeting both U.S. Used for products Used for products U.S. standards meeting both U.S. and Canadian standards meeting only products meeting and Canadiar, standards U.S. standards



# LBNL New EH&S Programs



Job Hazard Analysis (JHA) program

–John Seabury





- New MSD Hazard Communication sign
  - In place in Foundry, starting rest of the Division
  - Will need input from each lab and safety committee member
    - Via HEAR Database, to which all Safety Committee Members now have access



#### **Building 67 Room 6209**









#### MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT:

None		

#### APPLICABLE FORMAL WORK AUTHORIZATION DOCUMENTS:

AHD #3206

#### COMMENTS:

- 1. Room to be kept locked at all times. Access requires special training and authorization.
- 2. No ferrous equipment permitted within demarcated 5 Gauss magnetic field line.
- 3. Oxygen Deficiency Alarm: Detects oxygen deficiency resulting from release of liquid nitrogen or liquid helium. System will notify the Fire Department upon alarm. Exit the room in the event of an alarm and do not re-enter until the room has been deemed safe by Fire Department. DO NOT ENTER if the alarm has been triggered!

#### RESPONSIBLE INDIVIDUALS:

Name	Location	Work Phone #	Work Cell #	Home Phone #
Frank Svec	67-6116	(510)486-7964	(510)418-5174	(510)864-7090
John Klopp	67-6112	(510)486-6671		(415)861-2171

#### **BUILDING AND FACILITY MANAGER:**

Name	Location	Work Phone #	Work Cell #	Home Phone #
Gil Torres	62-104A	(510) 486-5395	(510)289-5137	(925) 756-7255
Rick Kelly	67-3205	(510) 486-4088	(510) 457-8452	(510) 537-8391

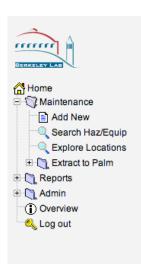
# **HEAR Database Update**

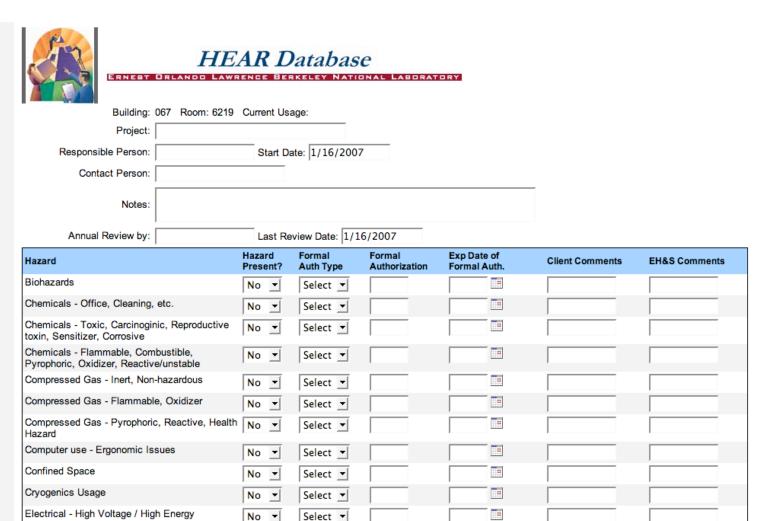
Electrical - Repair, Assembly, Testing

No ▼

Select ▼





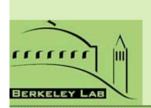




- Safety information cabinets in each building
  - Will include current EH&S information and be updated frequently







#### materials sciences division

SAFETY INFORMATION

MSD Safety & Current Announcements

Safety Committee and Group Representatives

**User Facility Safety** 

Safety Calendar & Meeting Notes

Pl and Student Resources

Safety Communications

**Training Resources** 

**EH&S Policy** 

**Emergency Plans** 

EH&S Databases and Assessment Reports

#### Division Integrated Safety Management Policy Statement

The Materials Sciences Division (MSD) has implemented an Integrated Safety

Management (ISM) program that meets or exceeds all of the standards described in

LBNL institutional policy and procedure. The requirements described in the Division ISM

Plan apply, as appropriate, to faculty, staff, matrixed staff, postdocs, students,

participating guests, visitors, users, vendors and contractors performing work under the
management control of MSD.

Principal investigators (PI's) and supervisors are responsible and accountable for implementation of this ISM plan in their labs and workplaces. PI's and supervisors may designate one or more "lab safety coordinator(s)" to assist in the implementation of the ISM plan and serve as a point of contact for EH&S issues. However, while activities can be delegated, the ultimate responsibility for implementing the ISM program cannot be delegated below the level of PI/supervisor. The scientist responsible for lab facilities that are shared with individuals outside his or her research group is responsible for ensuring that the guest/user has been fully trained and complies with applicable EH&S policies.

Principal investigators are responsible for authorizing all work in their laboratories. Pl's are also responsible for recognizing when they are planning work that requires formal authorization and obtaining that authorization prior to starting work.

#### Quick MSD Contacts

Rick Kelly, EH&S Manager: RJKelly@lbl.gov, 66-203; x 4088

Paul Johnson, EH&S Tech: PMJohnson@lbl.gov, 66-414, x5810

Gil Torres, Building Manager 62, 66, 67: CJTorres@lbl.gov, 62-104, x5395

Research Group Safety
Committee

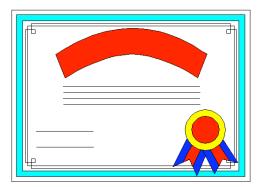
#### Recent Safety Incident

Recently, an MSD employee working on the UC Berkeley campus was injured when a gas cylinder fell on his foot, breaking two toes. The injury occurred during the transportation of gas



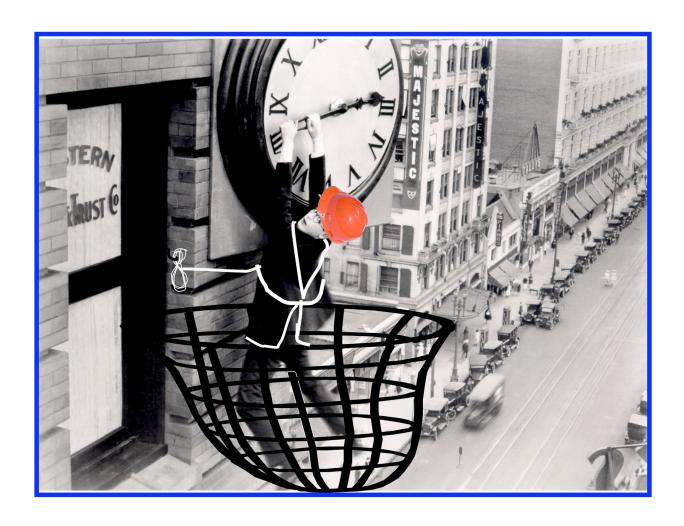
- Peer-to-peer student and postdoc training /refresher
  - Scheduled for June 12, 10-12
  - Looking for volunteer instructors—near misses, lessons learned, other safety topics
  - Refreshments will be served, awards will be given!







### Principal Investigators Guide to EH&S



# MSD Ongoing Initiative from 2006



#### Recommended Schedule for Recurring EH&S Activities

Activity	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Dispose of all waste in all SAAs*	X							X				
Review chemical inventory		X						X				
Review EH&S Assignments in lab**		X							X			
Inspect lab spaces			X			X				X		
Inspect SAAs	X			X			X				X	
Evaluate training of staff/students					X							X
Resubmit JHA for everyone					X							
Review and update AHDs on line						X						
Schedule safety meeting with staff	X			X			X			X		
Review outstanding issues in CATS			X			X			X			X

<sup>\*</sup> To avoid overloading EH&S, it is recommended that waste disposal proceed on the following schedule:

- l abs in building 2 follow the schedule shown on the table (January and August)
- labs in building 66 should delay the schedule by one month (February and September)
- labs in buildings 67 and 72 should delay the schedule by 2 months (March and October)
- l abs in building 62 delay the schedule by 3 months (April and November)

Monthly e-mails are going to each PI and SAA manager reminding them of the actions required for that month.

<sup>\*\*</sup>Assignments might include: 1) Division Safety Committee Member, 2) SAA Manager, 3) EH&S Coordinator

### Summary of Requested Actions



- Update HEAR database (by May 25)
- Distribute and discuss Materials Safety editions
- Discuss PIs Guide to EH&S, deliver to PI
- Discuss Division injuries and near misses
- Volunteer for student safety refresher (by May 15)
- Ensure that training is completed in a timely manner and the JHQs are updated annually
- Apply electrical safety labels

### **Discussion**



- Areas of concern
- Feedback
- Questions
- Next meeting: July 2007, exact date TBD

### The End!



